12 April 1961

MEMORANDUM FOR: Technical Development Board

THROUGH: Secretary, Technical Development Board

SUBJECT: Terminal Output Equipment for "Large-Area Record
                   Reader" (LARR)

1. The Problem

    To provide for printed and machine-readable output from the
████████████ LARR in such form as to be compatible with current and
future NPIC computing equipment.

2. Assumptions

    a.   At time of delivery of the LARR and its associated
    equipment, its output will be reduced on the present Alwac
    III-E computer.

    b.   The Alwac III-E will be replaced at some unspecified future
    date by some newer, also as yet unspecified, computer.

    c.   The replacement for the Alwac will have as a minimum input
    capability a high-speed paper tape reader, reading 6-channel
    tape.

    d.   The input logic of the "next" computer will be such that
    any of the 64 possible characters representable in a 6-channel
    tape code will be accepted as an input by the computer and will
    have a unique representation within the computer.

    e.   The "next" computer will have an "add" time of less than
    100 microseconds and will have core storage with access time
    less than 50 microseconds.

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3. Facts Bearing on the Problem

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    a.   The contracts with ████████████ for the construction of the
    LARR and its associated PIGMI II make no provision for other than
    visual read-out from the PIGMI.

DECLASS REVIEW by NIMA/DOD

b. Some time after the equipment had been contracted for, Messrs. ████████████████████████████ were informed of the nature of the LARR and PIGMI II and that they were being acquired, and were directed to specify the output characteristics to ████████████ Acting under the directive Messrs. ████ ███████ visited the ████████████ plant on 19 February 1961, and discussed the terminal output with the ████████████ engineers working on the project.

c. The minimum additional equipments to provide for a hardcopy output for the LARR operator and also output that can be read directly by the Alwac are:

(1) Electrotyper C,
(2) Friden tape punch,
(3) Translator with Alwac III-E code.

d. To provide for direct and immediate compatability with any other computer system that accepts paper tape input, it would be necessary to have a translator with interchangeable and "plugable" coding matrices.

e. To permit rapid change from one output format (i.e. the selection and ordering of the items to be output as a single record) it would be necessary to have removable and interchangeable patchboards in lieu of the fixed patchboard currently provided in the readout drawer.

f. The minimal requirement outlined in item (c) above would cost ████████

g. To provide the features described in items (d) and (e) above together with the Electrotyper C and tape punch would cost ████████

4. Discussion

The provision for direct conversion to other tape codes is essential if output may, at some future time go to some computer which accepts only some special code or which is too slow to permit programmed transliteration of codes other than its own "preferred" code. However, under Assumptions d and e above, which have since been accepted by the DMJM study group as generally valid, Alwac code will be acceptable by the "next" computer and there is no requirement for a capability for switching tape codes. The ability to change output formats permits more efficient

input programming for different applications of the LARR but under Assumption e this advantage becomes far less significant than when dealing with a "next" computer that may be "any" computer and is almost certainly not worth the additional cost.

5. Recommendations

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That the ███████ proposal, dated 8 March 1961, for redesign of the PIGMI II to provide for interchangable patchboards and tape code flexibility, not be accepted; and that in lieu there of a purchase order be placed with them for the following terminal output equipment to be provided with the LARR and PIGMI II:

(a) Electrotyper C
(b) Friden tape punch
(c) Translator with Alwac III-E code,

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